

CHERNOBROV, P.N., dotsent

- Longevity and average life expectancy of the population of
South Kazakhstan Province. Zdrav. Kazakh. 21 no.8:3-6 '61. (MIRA 14:9)
1. Iz kafedry organizatsii zdravookhraneniya i istorii meditsiny
(zav. - dotsent R.I.Samarin) Kazakhskogo meditsinskogo instituta.
(SOUTH KAZAKHSTAN PROVINCE--LONGEVITY)

CHERNOBROV, P.N.

Sources of Kazakh popular medicine. Zdrav. Kazakh. 23 no.2:
77-80'63. (MIRA 16:10)

1. Iz kafedry organizatsii zdavookhraneniya i istorii meditsiny (zav. - prof. R.I.Samarin) Kazakhskogo meditsinskogo instituta.

(KAZAKHSTAN--MEDICINE, POPULAR)

CHEPNOBROV, S. M.

USSR/Metals - Spectrum Analysis

Dec 50

"Determination of Nickel Admixtures in Cobalt by Spectral Analysis," S. M. Chernobrov, D. M. Shvarts, Inst of Nickel, Cobalt and Tin Ind

"Zavod Lab" No 12, pp 1505, 1506

Used anal of substances in powder state to det small amts of Ni in Co. Method excludes localization of Ni, which usually happens when ordinary metal specimens are used, and facilitates prepn of stds. Single detn, including preliminary chem treatment, takes 2-3 hrs. Av relative error is $\pm 8\%$.

182T95

CHERNOBROV S.M.

JPRS: L-974-N
CRO: 1745-N

U/L-1

THEORY AND PRACTICE OF THE APPLICATION OF ION-
EXCHANGE MATERIALS
K. V. Chernobrov

Georgiy I. Praktika Primeneniya
Ionobmennykh Materialov, Moscow,
1955, pp 1-164.

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Book published by AS USSR

• • CHERNOBROV, S.M.

USSR/Inorganic Chemistry - Complex Compounds

C.

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4094

Author : ~~Chernobrov, S.M.~~ Kolonina, N.P.

Title : On pH Value During Formation of Cobalt Hydroxides and Carbonates

Orig Pub : Zh. prikl. khimii, 1956, 29, No 5, 704-708

Abstract : By potentiometric titration using a glass electrode, a determination was made at 60° of the pH values during the formation of cobaltous hydrates and Co carbonates. It is shown that the pH of the beginning of formation of precipitates on titration of CoCl_2 with a solution of NaOH decreases from 5.6 to 3.8; on titration of CoCl_2 with a solution of Na_2CO_3 it decreases from 5.45 to 3.9; on titration of CoSO_4 with a solution of Na_2CO_3 it decreases from 5.5 to 4.4 with an increase in the concentration of Co^{2+} in the initial solution from 5 to 100 g/liter. Composition of basic salts formed on

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USSR/Inorganic Chemistry - Complex Compounds

C.

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 4094

addition of NaOH to CoCl_2 corresponds to the general formula $\text{CoCl}_2 \cdot n\text{Co}(\text{OH})_2 \cdot x\text{H}_2\text{O}$; from the equation of activity product a linear correlation between pH and $\lg c$ has been determined, c being the concentration of Co^{2+} in moles per 1 kg water. Experiments confirm this correlation. In the system $\text{CoCl}_2\text{-Na}_2\text{CO}_3$ is formed a precipitate having the composition $\text{CoCl}_2 \cdot m_1\text{CoCO}_3 \cdot n_1\text{Co}(\text{OH})_2 \cdot x_1\text{H}_2\text{O}$. The pH value at which the precipitate separates, is in this instance practically the same as in the case of the system $\text{CoCl}_2\text{-NaOH}$. A linear correlation between pH and $\lg c$ has also been determined in the case of the system $\text{CoSO}_4\text{-Na}_2\text{CO}_3$, but the inclination of the straight line in relation to the $\lg c$ axis is less in this instance than in the case of the chloride.

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SOV/137-58-9-18784

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 89 (USSR)

AUTHORS: Chernobrov, S.M., Gorelik, Ye.M.

TITLE: Use of Ion Exchangers to Extract Nickel and Cobalt from Ammonia Solutions (Primeneniye ionitov dlya izvlecheniya nikelya i kopal'ta iz ammiachnykh rastvorov)

PERIODICAL: V sb.: Materialy Soveshchaniya po primeneniyu obmena v tsvetn. metallurgii. Moscow, 1957, pp 64-72

ABSTRACT: A description is presented of methods of extracting nonferrous metals from NH_3 solutions of low metal content. Sulfo-carbon, (I), an ion exchanger made by sulfuric-acid treatment of a natural carbon, was used. The rate of flow of the solution was 1 m/hr in all experiments. In some experiments, determination of the dynamic exchange capacity (DEC) of I for Ni was quantitatively determined. Experiments in the simultaneous absorption of Ni and Co from ammonia solutions and in extraction of the absorbed metals from the I were run in a column 35 mm in diameter, the thickness of the layer being 900 mm and the quantity of I being 400 g. The initial solution contained 1 g Ni, 0.2 g Co, 50 g NH_3 and 100 g $(\text{NH}_4)_2\text{CO}_3$ /liter.

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Use of Ion Exchangers to Extract Nickel and Cobalt (cont.)

The experiments showed that I possesses the capacity to absorb Ni and Co from ammonia solutions. The DEC of I for Ni was found to be 0.5 and for Co 1.2 mg equiv/g. The absorbed Ni is virtually completely extracted from the I by the H_2 ion; extraction of the Co is somewhat more difficult. Joint absorption of the Ni and Co from ammonia solutions shows the Ni to be the first to appear in the filter. The DEC of I in terms of the combined total of Ni and Co ions is 1.9-2.0%. When Ni and Co are displaced by 150 H_2SO_4 /liter, up to 90% of the original Ni and up to 86% of the original Co are extracted in the final fraction. The volume of the concentrated fraction upon extraction is appx. one-tenth of the volume of the initial solution.

O.B.

1. Ammonia--Processing
2. Nickel--Separation
3. Copper--Separation
4. Ammonia--Test results

Card 2/2

Chernobrov, S.M.

AUTHOR: Chernobrov, S.M., Candidate of Technical Sciences 28-4-16/35

TITLE: Cobalt (Kobal't)

PERIODICAL: Standartizatsiya, 1957, # 4, pp 57-58 (USSR)

ABSTRACT: The new standard for cobalt, GOCT 123-57, which will replace GOCT 123-49 on 1 October 1957, contains a new grade, "K0", of high purity in addition to three other grades "K1", "K2" and "K3". The formerly used method of production by thermal recovery from cobalt oxide, gave a 99,25% pure cobalt, which is insufficiently pure. The author's institution - Gipronikel' - together with the combine Yuzhuralnikel', started experiments in the obtaining of pure cobalt by electrolysis in 1949. In 1950 the production of cobalt by use of insoluble anodes was organized. The obtained metal was purer than that obtained with the heat method, but still not sufficiently pure. Gipronikel' continued the work in 1956-1957 and obtained a dense metal which meets the conditions of the new standard. The permissible contents of all impurities (hydrogen, sulfur, manganese, nickel, copper, etc.) are indicated. As the obtaining of a cobalt with a nickel content not over 0.005% required a second electrolytic precipitation, this grade was omitted in the new standard as impractical.

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Cobalt

28-4-16/35

The nickel content in the grade "KO" will have to be stipulated in each order for the metal. It is stated that for some time past the fire-cobalt of grade "K1" (produced by the old method) approached the "KO" grade of the old standard or the "K1" of the new in purity. Most metallic cobalt produced by plants is of the old grade "KO".

ASSOCIATION: Gipro-nikel'

AVAILABLE: Library of Congress

Card 2/2

CHERNOBROV, S. M.

AUTHOR: Chernobrov, S. M. 32-9-7/43

TITLE: Application of the Ion Exchange in the Analytical Chemistry of Metals (Primeneniye ionnogo obmena v analiticheskoy khimii metallov)

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 9, pp. 1052-1055 (USSR)

ABSTRACT: Here a survey on the most important papers on determination of the metals according to the method of ion exchange chromatography and on the theory of the process, which were published in the second half of 1953, is given. This survey is briefly summarized in three chapters: 1) Theory of the ion exchange. Ion exchange materials. 2) Methods of the cation exchange. 3) Methods of the anion exchange. There are 61 references, 33 of which are Slavic.

AVAILABLE: Library of Congress.

Card 1/1

CHERNOBROV, S.M.

BELOZERSKIY, N.A.; ORMONT, B.F., prof., doktor, retsenzent; FILIN, N.A.,
prof.doktor, retsenzent; KHEYFETS, V.L., kand.tekhn.nauk, retsenzent;
CHERNOBROV, S.M., red.; KAMAYEVA, O.M., red.izd-va; ATTOPOVICH, M.K.,
tekhn.red.

[Carbonyls of metals] Karbonily metallov. Moskva, Gos.nauchno-
tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1958.
372 p. (MIRA 11:7)

(Carbonyls) (Organometallic compounds)

5.1310(A)

66557

SOV/81-59-15-52784

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 15, p 69 (USSR)

AUTHORS: Chernobrov, S.M., Kolonina, N.P.

TITLE: On the Cathode Polarization in Electrolytic Deposition of Cobalt

PERIODICAL: Tr. Proyechn. i n.-i. in-ta "Gipronikel", 1958, Nr 1, pp 150-159

ABSTRACT: The cathode polarization (CP) in electric deposition of Co, depending on the temperature (40, 60 and 80°C), the nature of the anions and H_3BO_3 additions, has been studied. CP decreases with an increase in the temperature and increases on adding H_3BO_3 and on substituting chloride solutions by sulfate solutions. The dependence (φ , lg i) is linear, in the case of a chloride solution the transfer coefficient $\alpha = 0.7 - 0.8$. Additions of H_3BO_3 increase the CP; in the presence of Cl^- -ions CP is less than in the presence of SO_4^{2-} -ions. The opinion has been expressed that the deposition rate of Co is determined by the stage of the discharge, that H_3BO_3 increases the activation energy of the discharge process and that the Cl^- -ions are specifically adsorbed on the cathode.

Card 1/1

Z. Solov'yeva. *X*

STRELETS, Kh.L.; TAYTS, A.Yu.; GULYANITSKIY, B.S.; PAZUKHIN, V.A., prof.,
doktor tekhn.nauk, retsenzent; KHEYFITS, Ya.M., kand.khim.nauk,
retsenzent; VERIGIN, V.N., kand.tekhn.nauk, retsenzent; FISHER,
A.Ya., kand.tekhn.nauk; retsenzent; TSENTER, Ya.A., kand.tekhn.
nauk, retsenzent; MARKOV, G.S., inzh., retsenzent; KRIVORUCHENKO,
V.V., inzh., retsenzent; CHERNOBROV, S.M., red.; ARKHANGEL'SKAYA,
M.S., red.izd-va; KLEYMAN, M.R., tekhn.red.

[Magnesium metallurgy] Metallurgiya magniia. Izd.2., perer. i
dop. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi
metallurgii, 1960. 479 p. (MIRA 13:5)
(Magnesium--Metallurgy)

CHERNOBROV, S.M., otv. red.; LASKORIN, B.N., red.; KLYACHKO, V.A.,
red.; MATEROVA, Ya.A., red.; LANGE, A.Z., red.; VITTIKH,
M.V., red.; SHOSTAK, F.T., red.; SAVENKO, O.D., red.;
ZYKOVA, V.V., red.; GLAZYRINA, D.M., red.; ALFEROVA, P.F.,
tekhn. red.

[Theory and practice of ion exchange] Teoriia i praktika ion-
nogo obmena; trudy. Alma-Ata, Izd-vo AN Kaz.SSR, 1963. 186 p.
(MIRA 17:3)

1. Kazakhstanskoye respublikanskoye nauchno-tekhnicheskoye so-
veshchaniye po ionnomu obmenu. 1962. (MIRA 17:3)

CHERNOBROV, S.M.

Development of the methods of ion exchange in the analytical chemistry
of metals (survey). Zav.lab. 29 no.11:1281-1288 '63.

(MIRA 16:12)

BOGDANOV, O.S., doktor tekhn. nauk, prof., otv. red.; BRAND, V.Yu.,
kand. tekhn. nauk, red.; DERKACH, V.G., doktor tekhn. nauk,
red.; ZAKHVATKIN, V.K., red.; OLEVSKIY, V.A., kand. tekhn.
nauk, red.; LOKONOV, M.F., kand. tekhn. nauk, red.; PODNEK,
A.K., kand. tekhn. nauk, red.; TUSEYEV, A.A., red.;
FINKEL'SHTEYN, G.A., kand. tekhn. nauk, red.; FOMIN, Ya.I.,
kand. tekhn. nauk, red.; CHERNOBROV, S.M., kand. tekhn. nauk,
red.; KUTUZOVA, L.M., red.

[Transactions of the Fourth Scientific Technological Session
of the Scientific Research Institute for Mechanical Concentra-
tion of Minerals] Trudy IV nauchno-tekhnicheskoi sessii insti-
tuta MEKHANOBOR. Leningrad, 1961. 665 p. (MIRA 17:5)

1. Leningrad. Nauchno-issledovatel'skiy i proyektnyy institut
mekhanicheskoy obrabotki poleznykh iskopayemykh.

CHERNOBROV, V., ptichnik

On the path toward the goals set by innovators. Sov. profsoiuzy 20
no.1:16-17 Ja '64. (MIRA 17:2)

1. Sovkhoz "Timiryazevskiy" Nikolayevskoy oblasti; chlen Nikolayevskogo
oblastnogo sel'skogo soveta professional'nykh soyuzov.

CHERNOBROVA, V.K.

Prevention of birth injury in transverse and oblique position
of the fetus. Vop. okhr. materin. dets. 8 no.1:59-63 '63
(MIRA 17:2)

1. Iz kliniki akusherstva i ginekologii (zav. - prof. G.N.
Smirnov) Ryazanskogo meditsinskogo instituta.

CHERNOBROVA, V.K.

Influence of prolonged pregnancy on the course and outcome of labor. Nauch.trudy R'az.med.inst. 18 no.2:237-243 '64.

Histomorphological changes in the placenta in prolonged pregnancy. Ibid.:244-247 (MIRA 19:1)

1. Kafedra akusherstva i ginekologii (zav. - prof. G.N.Smironov)
Ryazanskogo meditsinskogo instituta.

COUNTRY : USSR
CATEGORY : Farm Animals. General Problems. Q
ABS. JOUR. : RZhBiol., No. 3, 1959, No. 11971
AUTHOR : Chernobrovenko, P. S.
INST. : ~~Voronezh~~ Institute of Agriculture.
TITLE : The Methods of Strengthening the Feed Bases
in Kolchozes of the Voronezhskaya Oblast'.
ORIG. PUB. : Zap. Voronezhsk. s.-kh. in-ta, 1958, 27. No 3,
251-261
ABSTRACT : No abstract.

Card: 1/1

CHERNOBROVINA, S. M.; ZHIGAL'TSEVA, M. I.

Preliminary results of using electric equipment in orchards
in Moldavia. Izv. AN Mold. SSR no.9:68-75 '62.
(MIRA 16:1)

(Moldavia—Fruit—Diseases and pests)
(Moldavia—Insect traps)

CHERNOBROVINA, S. M.

Some data on electric equipment used in the field of plant
protection against flying agricultural pests. Izv. AN Mold.
SSR no.9:38-44 '62. (MIRA 16:1)

(Insect traps)

CHERNOBROVKIN, A.

AID P - 3472

Subject : USSR/Aeronautics

Card 1/1 Pub. 135 - 7/20

Author : Chernobrovkin, A., Col.

Title : Winter sports for pilots

Periodical : Vest. voz. flota, 12, 32-35, D 1955

Abstract : The author lists various winter sports and games considered advisable for the general training of pilots.

Institution : None

Submitted : No date

L 08284-62 EWT(1) JK
ACC NR: AP7001081 (AN)

SOURCE CODE: UR/0439/66/045/003/0375/0332

AUTHOR: Zhigal'tseva, M. I.; Chernobrovina, S. M.

ORG: Kishinev State University (Kishinevskiy gosudarstvennyy universitet);
Institute of Applied Physics, AN Moldavian SSR, Kishinev (Institut prikladnoy fiziki
Akademii nauk Moldavskoy SSR)

TITLE: Application of ultraviolet-ray sources to insect pest control

SOURCE: Zoologicheskiy zhurnal, v. 45, no. 3, 1966, 375-382

TOPIC TAGS: insect, insect reproduction, disease vector, insecticide, pest,
ultraviolet light

ABSTRACT: The following genera of the insects were tested with respect to their response to visible light including the ultraviolet light region: Homoptera, Cicadina, Psylloidea, Aphidoidea, Coccoidea, Coleoptera, Cerambycidae, Scarabaeidae, Curculionidae, Ipidae, Diptera, Lepidoptera, Tortricidae, Cossidae, Gracilariidae, Glyptipterygidae, Plutellidae, Hyponomeutidae, Lyonettidae, Cemiostomidae, Coleophoriidae, Gelechiidae, Pieridae, Lasiocampidae, Orgyidae, Noctuidae, Arctiidae, Aegeriidae, and Hymenoptera. The actual field testing

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UDC: 595.7:579.6

L 08281-67

ACC NR: AP7001081

indicates that it is mainly the young unfertilized or nulliparous females that are attracted to light. By the selective application of various light sources it is possible to attract predominantly harmful or innocuous insects. The former may subsequently be exterminated by insecticides. It is concluded that light sources of various types could be used for selective attraction of different insect species, thus making it possible to estimate the insect population and reproduction of a given genus and to carry out a series of studies related to the disease-vector problem. Orig. art. has: 2 figures and 7 tables. [WA-50]

SUB CODE: 06/SUBM DATE: none/ORIG REF: 009/OTH REF: 005/

Card 2/2

CHEKHOVSKIN, A. P.

Dissertation: "Investigation of the Turbocyclone Method of Cleaning a Dust-Laden Flow."
Cand Tech Sci, Moscow Order of Labor Red Banner Higher Technical School imeni Bauman,
31 May 54. Vechernyaya Moskva, Moscow, 21 May 54.

SO: SUM 284, 26 Nov 1954

CHERNOBROVSKIN, A. P.

USSR/Engineering - Gas Turbines

FD-1454

Card 1/1 : Pub. 41-8/17

Author : Chernobrovkin, A. P., Moscow

Title : Investigation of a new system for purification of a dust-laden stream

Periodical : Izv. AN SSSR. Otd. tekhn. nauk 7, 77-86, Jul 54

Abstract : Describes new centrifugal-type experimental plant for purification of dust-laden air stream to be used in conjunction with gas turbine operating on solid fuel. Gives results of experiments conducted on above-mentioned plant for determination of following: degree of purification of gas at various peripheral speeds of turbocyclone, effect of various concentrations of dust on degree of purification at a given peripheral speed, fractional degree of purification, and hydraulic loss of turbocyclone. Diagrams; graphs; tables. Three references.

Institution :

Submitted : July 16, 1954

UVAROV, V.V., prof., doktor tekhn.nauk; LEBEDYANSKIY, L.S., konstruktor;
OMIROV, V.S., inzh.; ~~CHERNOBROVKIN, A.P.~~, kand.tekhn.nauk, dots.;
SHARGOVSKIY, R.I., inzh.; SHUPILOV, V.P., inzh.

The 6,000 hp. gas turbine locomotive constructed by the Kolomna
Plant. Izv.vys.ucheb.zav.; mashinostr. no.6:104-108 '58.
(MIRA 12:8)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche im. Baumana
i Kolomenskiy teplovozostroitel'nyy zavod im. Kuybysheva.
(Gas turbine locomotives)

AUTHORS: Uvarov, V.V. (Dr.Tech.Sci.), ^{SOV/96-59-10-2/22} Chernobrovkin, A.P. (Cand. Tech.Sci.), Beknev, V.S. (Cand.Tech.Sci.),
Manushin, E.A. (Engineer) and Pankov, O.M. (Engineer)

TITLE: The Development of High Output Gas-turbine Sets

PERIODICAL: Teploenergetika, 1959, Nr 10, pp 8-17 (USSR)

ABSTRACT: The availability of gas and oil for power station fuel makes the use of gas turbines economically attractive, yet they are still looked upon as essentially small- or medium-output machines. Although the Khar'kov Turbine Works has designed a gas turbine of 50 MW and the Leningrad Metal Works one of 100 MW, the possibility of designing gas turbines of 300 MW and more has not been fully studied. Theoretical investigations at the Moscow Technical High School have shown that it is quite possible to develop gas turbines with outputs up to 300 MW or more at gas temperatures of 700-750 °C. Output can be raised by a combination of the following factors: increasing the axial velocity at the outlet from the last stages of the turbines and using special diffusers; replacing the regenerator by additional coolers and intermediate combustion chambers, with simultaneous

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The Development of High Output Gas-turbine Sets

increase in pressure to 60-80 atms; and driving the generator from the high- or medium-pressure shaft of the gas turbine. These factors are then considered separately in more detail. Axial outlet velocities are made low to avoid high outlet losses which may, however, be reduced by the use of a diffuser. Diffusers present certain problems. The Moscow Technical High School has investigated a diffuser that is represented diagrammatically in Fig 1. On leaving the blading of the last stages, gas passes through rows of fixed blades in which it is retarded and turned through an angle. Fig 1 shows three rows of blades but it may be necessary to use four to turn the flow through 90 degrees. The overall efficiency of such diffusers should be 75-80%, but this requires experimental proof. In an experimental rig the width of the gas flow was 80 mm at a mean diameter of 240 mm. The Ts-diagram for the diffuser is included in Fig 1 and efficiency formulae are given. The outlet velocity from the Leningrad Metal Works 100-MW gas turbine is about 130 m/sec; in the absence of a diffuser the associated loss is about 2 kcal/kg and with a diffuser it is about 0.6 kcal/kg. If the speed is increased to

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The Development of High Output Gas-turbine Sets

260 m/sec the output is almost doubled and becomes 195 MW; the outlet loss with a diffuser is 2.4 kcal/kg, or without one 8 kcal/kg, which increases the fuel consumption by 9%. The effect of cutting out the regenerator and increasing the pressure is then considered and the design of Brown Boveri turbines at Livorno, Betz nau and in Peru are discussed. The general conclusion is that gas turbines with regeneration have considerable aerodynamic loss and it is interesting to note that recent Brown Boveri turbines are made without a regenerator. Efficiency calculations were made on four cycles: cycles I and II have regeneration; cycles III and IV do not, but have an increased number of coolers and intermediate combustion chambers. The optimum value of pressure increase was chosen for each cycle. Ts-diagrams for the various cycles are shown in Fig 2 and the main operating and performance data are given in Table 1. Examination of the data shows that all the cycles have about the same efficiency, but with no regeneration the number of turbine stages increases, for example, from seven stages in cycle I to ten stages in cycle IV. The number of

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The Development of High Output Gas-turbine Sets

compressor stages will also be increased in a similar way. Much greater outputs can be obtained from the cycles without regenerators. A diagram of the turbine and compressor layout for operation on cycle III is given in Fig 3, in which turbine Nr 4 may have either single or double flow. The turbine outlet temperature is 682 °K which is the same as for cycle I but the pressure is 2.66 atm, whilst for cycle I it is 1.04 atm. The output that can be obtained from cycle III is a little over three and a half times that obtainable from cycle I, whilst with cycle II the possible output is appreciably lower than for cycle I. The effect of driving the generator from the high- or medium-pressure turbine shaft is then considered. A somewhat similar arrangement to that shown in Fig 3 was used by Brown Boveri at Setznsu and Peru, but the circuit of Fig 3 offers certain advantages. The governor may control the fuel consumption in the three combustion chambers and can ensure the best load distribution between the various turbines. A number of output and efficiency calculations are then made. Eq (4) gives the output per unit area of flow and Eq (5) the efficiency. Stresses due to centrifugal force are

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SOV/96-59-10-2/22

The Development of High Output Gas-turbine Sets

proportional to the area of flow and the permissible stress depends on the temperature and the steel. For the purposes of the calculation steel IKh13 was assumed, and calculated values of temperature and efficiency are given in Table 2. Calculated values of output per unit area of flow are given in Table 3 in MW/m². Table 3 shows the extent to which the maximum output is reduced by the use of regeneration; thus with cycle IV the output is over three and a half times that of cycle I for the same efficiency of 37.4%. In the Leningrad Metal Works 100-MW gas turbine the output area from the last stage is about 2.7 m², which with cycle I would give an output of 117.6 MW and with cycle IV 415 MW, if double exhaust were used. Other cycles of somewhat higher efficiency but somewhat lower output are possible. The compressor and turbine efficiency data were assessed on the basis of the comparatively small Brown Boveri turbines; higher efficiency and Reynolds numbers would be obtained for large turbines of 200-400 MW. as indicated in Tables 5 and 6. For a large turbine an overall efficiency of about 40% would be expected. Figs 4, 5 and 6 show the Ts-diagrams for cycle I, cycle IV and the

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cycle of the Leningrad Metal Works 100-MW turbine respectively. Calculated values of efficiency for all three cycles are given in Table 4 in which the turbine output is given in megawatts per square metre of exhaust area. It follows from the data given in Tables 3 and 4 that if the generator turbine has a single exhaust, outputs up to 300 MW can be obtained with an outlet velocity loss of 4% and an outlet area of 2.5-2.7 m². It would be relatively simple to construct a turbine of 200 MW with a single flow, or 400 MW with double flow, and an efficiency of about 40%. Allowing somewhat higher losses it should be possible to build a 600 MW gas turbine with double flow and an efficiency of about 39%. Questions of cooler surface area and quantity of cooling water are then considered and it is shown that the 300 MW gas turbine would only require about one seventh the cooling water of a 300 MW steam turbine. The results of a number of strength calculations are then given, particularly for the blading, and recorded in Tables 5 and 6. It is concluded that it would be quite practicable to build gas turbines of 400 MW or even 600 MW. The weight of a 300 MW turbine using cycle IV and the circuit

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SOV/96-59-10-2/22

The Development of High Output Gas-turbine Sets

of Fig 3 would be about 1200 tons, excluding the weight of the pipework. A weight of 5-6 kg/kW (excluding the alternator) is to be expected. The calculation of permissible bending stress on the blades is of great interest as it largely governs the amount of metal required in the turbine. The article does not consider the cycle with high-pressure regeneration. This cycle is somewhat more efficient than those considered, but gives rather lower output than cycle IV. Moreover, the design of a high-pressure regenerator presents a number of problems, but before a final choice of cycle is made it will be necessary to consider the cycle with high-pressure regeneration.

Card 7/7 There are 6 figures, 6 tables and 4 references, of which 2 are Soviet and 2 German.

ASSOCIATION: Moskovskoye vyssheye tekhnicheskoye uchilishche
(Moscow School of Higher Technical Education)

CHERNOBROVSKIN, A. P.

Gazovyye turbiny [b.] V.V. Uvarov [i] Moskva, Mashgiz, 1960.
140 [1] p. illus., diagrs., graphs, tables. (Sovetskoye
Mashinostroyeniye v 1959-1965 gg)
Bibliography: p. 140- [141]

S/145/60/000/002/004/020
D221/D302

AUTHOR: Chernobrovkin, A.P., Candidate of Technical Sciences
TITLE: On selecting a locomotive gas turbine installation
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Mashino-
stroyeniye, no. 2, 1960, 40 - 51

TEXT: The coefficient of efficiency of single-shaft gas turbines made abroad is 16-18 %, compared to 26-28 % of steam locomotives. This is, however, compensated by a greater power per weight of the former, as well as by cheaper fuel used in gas turbines. The single-shaft installation with electrical transmission has 19-20 % efficiency at maximum output, and this drops when the load is reduced. The 3500 HP gas turbine at the Kolomna Steam Locomotive Factory weighs 9 tons compared to 30 tons of the electrical transmission. The Department of Steam and Gas Turbines at MVTU im. Bauman considered various schemes of economical gas turbine sets for the Kolomna Plant. The arrangement with a regenerator was not successful. The introduction of intermediate cooling and after-burning resulted

Card 1/3

On selecting a locomotive gas ...

S/145/60/000/002/004/020
D221/D302

in a marked improvement unsavings and calculations revealed that the efficiency may reach 28-29 %. The arrangement consists of a two-shaft set with after-burning between the high and medium pressure turbines that are mounted on the same shaft as the high pressure compressor. The cooler can be cut off during winter. The author considers the variation of fuel consumption at different loads of gas turbines with intermediate cooling and after-burning. Higher efficiency with relatively little design complication can be ensured when higher gas temperature is used. This also results in minimum dimensions for the equipment. The designed variant envisages a power of 7000 HP with a gas temperature of 1100°C, and cooling both stator and rotor blades of the first stages. Two-cascade air compression is chosen to ensure a ratio of pressure increase of $\pi_k=18$. The design provides cooling by air drawn from the last stage of the compressor. The internal cavities of blades and the radiators that are welded to blade roots are filled with the liquid heat carrier. The unit has a coefficient of efficiency of 30 %. The inclusion of a cooler between the cascade of the compressor can bring further improvement. Overall dimensions of this set are equal

Card 2/3

On selecting a locomotive gas ...

S/145/60/000/002/004/020
D221/D302

to the size of a gas turbine made by the Kolomna Factory that is half its power, and where the gas temperature is 730°C. The author includes a tabulated comparison of projects, all of which have a electrical transmission. The latter can be discarded because mechanical transmission has a greater efficiency. Its use instead of an electrical transmission will enhance the efficiency coefficient of sets and also reduce their weight. There are 8 figures, 1 table and 3 Soviet-bloc references.

ASSOCIATION: MVTU im. Baumana (MVTU im. Bauman)

SUBMITTED: December 15, 1959

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni Baumana.

(Gas turbine locomotives--Design and Construction)

Card 3/3

CHERNOBROVKIN, A.P., kand.tekhn.nauk.dotsent

Locomotive gas-turbine units. Izv.vys.ucheb.zav.; mashinostr. no.3:135-146 '60. (MIRA 14:3)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni N.E. Baumana.
(Locomotives, Gas turbine)

UVAROV, Vladimir Vasil'yevich; BEKNEV, Viktor Sergeyevich; GRYAZNOV, Nikolay Dmitriyevich; MIKHAL'TSEV, Vsevolod Yevgen'yevich; MUSATOV, Aleksandr Konstantinovich; PCHELKIN, Yuriy Mikhaylovich; CHERNOBROVKIN, Aleksey Petrovich; YUNOSHEV, Viktor Dmitriyevich; BARTASH, Ye.T., kand. tekhn.nauk, retsenzent; GALANOVA, M.S., inzh., red. izd-va; UVAROVA, A.F., tekhn. red.

[Gas-turbine units for locomotives; design and calculation]Lokomotivnye gazoturbinnye ustanovki; raschet i proektirovanie. [By] V.V.Uvarov i dr. Moskva, Mashgiz, 1962. 547 p. (MIRA 15:9)
(Gas-turbine locomotives)

UVAROV, V.V., doktor tekhn.nauk, prof.; CHERNOBROVKIN, A.P., dotsent, kand.tekhn.nauk;
MANUSHIN, E.A., inzh.

High-power gas-turbine unit with a high pressure of the actuating fluid.
Izv.vys.ucheb.zav.; mashinostr.no.1:130-139 '63.

(MIRA 16:5)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche imeni Baumana.
(Gas turbines)

L 24084-66

ACC NR: AP6015525

SOURCE CODE: UR/0096/65/000/005/0007/0016

AUTHOR: Uvarov, V. V. (Doctor of technical sciences; Professor); Beknev, V. S. (Candidate of technical sciences); Mikhal'tsev, V. Ye. (Candidate of technical sciences); Chernobrovkin, A. P. (Candidate of technical sciences); Lapin, Yu. D. (Engineer); Cherepnin, L. S. (Engineer)

ORG: MVTU im. Bauman

TITLE: High-efficiency 200 megawatt gas-turbine installation

SOURCE: Teploenergetika, no. 5, 1965, 7-16

TOPIC TAGS: gas turbine, electric power plant

ABSTRACT: The advantages of building a high pressure non-regenerative 200 megawatt gas-turbine installation with an approximate weight factor of 3.5 kg/kw are described. This factor is 2.5 times smaller than in steam gas installations and seven times smaller than in steam power installations. Calculations indicate that a gas-turbine installation requires about 50% lower capital investment as compared to a steam power installation, lowers the volume and cost of the main structure three times and the cost per kilowatt-hour not less than 15%. The possibility of building powerful gas-turbine installations with gas temperature of 750-800°C is indicated. Adoption of still higher temperature up to 1200°C, will increase the efficiency to 53-55% and double the power. Orig. art. has: 10 figures and 5 tables. [JPRS]

SUB CODE: 10 / SUM DATE: none / ORIG REF: 006 / OTH REF: 001

Card 1/1

UDC: 621.438.001.5

CHERNOBROVKIN, A. I.

CHERNOBROVKIN, A. I. O. Inzh. i IVANOVA, A. V. O. Ml. Nauchn. Sotr., ILINA, N. P.
Kand. Tekhn. Nauk

Akademiya Kommunal'nogo Khozyaystva im. K. D. Pamfilova

Meropriyatiya po bor'be s korroziyey stal'nykh Krovel'

Page 70

SO: Collections of Annotations of Scientific Research Work on Construction, completed
in 1950.
Moscow, 1951

AUTHOR: Chernobrovkin, B.S., Engineer, 28-6-7/40

TITLE: Plotting of Nomograms for the Determination of Allowances and Tolerances by the Principle of Equal Allowance Lines (Postroyeniye nomogramm dlya opredeleniya pripuskov i dopuskov po printsipu liniy ravnogo pripuska)

PERIODICAL: Standartizatsiya, 1957, # 6, pp 25 - 28 (USSR)

ABSTRACT: In "ГОСТ 7062-54"-standard for allowances and tolerances of steel forgings produced by free forging in presses the recommendations are subdivided in forging-size groups within which the allowance remains equal. In this way, one and the same allowance is recommended for the largest and the smallest forging of a group. The difference in length and diameter of the largest forging in a group and the smallest in the next group is only 1 mm, while the allowance increases by 8 mm. The author suggests nomograms, plotted by himself, for allowances and tolerances. These would eliminate the unnecessary machining caused by the state regulations.
There are 2 graphs and 2 sketches.

ASSOCIATION: Uralmashzavod

AVAILABLE: Library of Congress

Card 1/1 1. Industry-USSR 2. Forging-Standards

KAMENSHCHIKOV, Grigoriy Georgiyevich; KOLTUN, Sergey Ivanovich, inzh.;
NAUMOV, Vasilii Prokhorovich, inzh.; CHERNOBROVKIN, Boris
Sergeyevich, inzh.; POLYAKOV, V.P., inzh., retsenzent; KAZARINOV,
B.K., inzh., retsenzent; KON'KOV, A.S., dotsent, red.; DUGINA,
N.A., tekhn.red.

[Forging operations] Kuznechnoe proizvodstvo. Izd.3., ispr. 1
dop. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1959.
447 p. (MIRA 12:8)

1. Uralmashzavod (for Koltun, Chernobrovkin). 2. Sverdlovskiy
zavod transportnogo mashinostroyeniya (for Naumov).
(Forging)

LEBEDEV, Aleksandr Aleksandrovich, doktor tekhn. nauk, prof.;
CHERNOBROVKIN, Lev Semenovich; TKACHENKO, Ya.Ye., retsenzent;
TOMASHEVICH, D.L., doktor tekhn. nauk, retsenzent; KHELYFETS,
N.A., doktor tekhn. nauk, retsenzent; GORTSUYEVA, N.A., red.
izd-va; ROZHIN, V.P., tekhn. red.

[Dynamics of the flight of pilotless aircraft] Dinamika poleta
bespilotnykh letatel'nykh apparatov. Pod red. A.A.Lebedeva.
Moskva, Oborongiz, 1962. 548 p. (MIRA 15:12)
(Aerodynamics) (Guided missiles)

ACCESSION NR: AP4033038

8/0147/64/000/001/0037/0046

AUTHOR: Chernobrovkin, L. S.

TITLE: Determination of the relative fuel mass and thrust capacity of an aircraft when its law of motion is prescribed

SOURCE: IVUZ. Aviatsionnaya tekhnika, no. 1, 1964, 37-46

TOPIC TAGS: aircraft, fuel, fuel mass, thrust, thrust capacity, aircraft design, mach number drag, angle of attack, rocket engine, altitude, slight altitude, jet engine, trajectory, aircraft trajectory, aircraft gravity, kinematics

ABSTRACT: The author notes that, in the design of aircraft, it frequently becomes necessary to determine the relative mass of the fuel $\mu_f = \frac{m_f}{m_r}$ and the thrust

$\bar{P}(t) = \frac{P(t)}{m_r g}$ which ensure flight according to a prescribed law. Some techniques for accomplishing this are discussed and it is pointed out that, in general, in order to determine the relative mass of the fuel and the thrust it is necessary to integrate a system of

Card 1/6

ACCESSION NR: AP4033038

motion equations for the aircraft, involving the use of extremely time-consuming numerical methods. On the other hand, an analytical solution of this problem is possible only if certain assumptions are made, the fundamental assumption consisting of the fact that the angle of attack is considered to be prescribed, as a result of which the drag (head resistance) factor c_x is a function only of the M number. In the present article, the author has posed the problem of finding approximate algebraic expressions for μ_f and $\bar{P}(t)$ free of any constraints on the form of the trajectory of the aircraft (previously this had been accomplished by other investigators for rectilinear flight). In addition to the assumption made above, two additional assumptions were made. 1. The angle of attack α and the setting angle of the engine relative to the axis of the hull $\varphi_{eng.}$ are small, so that $\cos(\alpha + \varphi_{eng.}) \approx 1$. 2. The specific thrust of the engine is constant and is equal to the mean value $P_{eng.}$ in the prescribed range of speeds, flight altitudes, and engine operating conditions (this assumption is almost always acceptable in liquid- and solid-fuel rocket engines, since in these engines $P_{eng.}$ changes within narrow limits; for jet engines the assumption $P_{eng.} = \text{const.}$ is acceptable only in the event that the range of speeds of the aircraft is not large). The second section of the paper deals with the derivation of the calculation formulas. For the relative fuel mass the author obtains the following formula:

$$\mu_f = \frac{\frac{V_1 - V_0}{g} + \frac{\tau}{6} (\sin \theta_0 + 4 \sin \theta_{0.5} + \sin \theta_1) + \frac{\tau}{6} (q_{0.5} + 4q_{0.5} \theta_{0.5} + q_{1.5})}{P_{ya} + \frac{V_1 - V_{ep}}{g} + \frac{\tau}{6} (2 \sin \theta_{0.5} + \sin \theta_1) + \frac{2\tau}{3} \left(\frac{V_{0.5}}{g} + \sin \theta_{0.5} \right) \Delta t_{0.5}} \quad (1)$$

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ACCESSION NR: AP4033038

and for the thrust of the ship at the beginning, middle, and end of the flight time:

$$\bar{P}_0 = \frac{V_0}{g} + \sin \theta_0 + q_0 \sigma_0, \quad (2)$$

$$\bar{P}_{0.5} = \left(\frac{V_{0.5}}{g} + \sin \theta_{0.5} \right) [1 - (0.5 + \Delta \xi_{0.5}) \mu_r] + q_{0.5} \sigma_{0.5}, \quad (3)$$

$$\bar{P}_1 = \left(\frac{V_1}{g} + \sin \theta_1 \right) (1 - \mu_r) + q_1 \sigma_1. \quad (4)$$

The value $\Delta \xi_{0.5}$, found in these formulas, is determined by the expression:

$$\Delta \xi_{0.5} = \frac{1}{P_{ya} \mu_r} \int_0^{0.5\tau} \bar{P} dt - 0.5 \approx \frac{\tau}{4} \frac{\bar{P}_0 + \bar{P}_{0.5}}{P_{ya} \mu_r} - 0.5. \quad (5)$$

Three special cases are considered on the basis of the formulas derived: 1) if the trajectory is rectilinear and acceleration is constant (that is, $\theta = \text{const}$ and $V = \frac{V_1 - V_0}{\tau} = \text{const}$); 2) if the flight occurs at constant altitude and constant speed ($\theta = 0$, $V = \text{const}$), as characteristically in the case of aircraft; 3) if energy losses for overcoming the forces of gravity

Card 3/5

ACCESSION NR: AP4033038

and drag equal zero. The above-described method for computing μ_f gives good results if the functions $V(t)$, $\theta(t)$, $\alpha(t)$ are smooth. However, occasionally the kinematic characteristics at several points of the trajectory may undergo sharp changes. The author points out that, in these cases, in order to increase the accuracy of the computation, the trajectory must be broken down into sections. Several examples of this kind of operation are considered in the paper. An evaluation of the accuracy of the formulae derived was made on the basis of numerical computations, for which trajectories with a rather wide range of characteristics were selected. These data are given in Table 1 of the Enclosure. The results show that, for all their simplicity, the approximate formulae have an extremely small error. Thus, they may be recommended for practical use, in which case it will almost always be possible to limit the computations to the first approximation, having recourse to the second approximation only in those individual cases in which increased accuracy is a requisite. Orig. art. has: 35 formulas, 5 figures and 2 tables.

ASSOCIATION: none

SUBMITTED: 03Sep63

DATE ACQ: 11May64

ENCL: 01

SUB CODE: AC

NO REF SOV: 003

OTHER: 000

Card 4/5

ACCESSION NR: AP4033038

ENCLOSURE: 01

Table 1. Trajectory Characteristics

No. of example	Speed $V \frac{m}{sec.}$	Angle of Inclination θ of the trajectory	Height H KM		
			H_0	$H_{0,5}$	H_1
1	$V = 600 + \frac{t^2}{3}$	15°	2	7.5	17.5
2		45°	2	16.9	44.4
3	$V = 600 + \frac{40}{3}t$	15°	2	8.2	17.5
4		45°	2	19	44.4
5	$V = 1200 - \frac{1}{6}(60-t)^2$	15°	2	8.6	17.5
6		45°	2	20	44.4
7	$V = 400 + \frac{20}{3}t$	$\theta = 90 - 2.49 \cdot 10^{-3} S$	2	16	25
8		$\theta = 2.49 \cdot 10^{-3} S$	2	6.75	25
9	$V = 600 + \frac{480}{11}t$ (at $0 < t < 10$), $V = 1036$ (at $10 < t < 60$)	0	15	15	15

Card 5/5

C.HERNOBROVSKIN, L.S.

PHASE I BOOK EXPLOITATION

SOV/6287

Lebedev, Aleksandr Aleksandrovich, and Lev Semenovich Chernobrovkin.

Dinamika poleta bespilotnykh letatel'nykh apparatov (Flight Dynamics of Pilotless Aircraft). Moskva, Oborongiz, 1962. 548 p. Errata slip inserted. 7000 copies printed.

Ed. (Title page): A. A. Lebedev, Doctor of Technical Sciences, Professor; Reviewers: D. L. Tomashevich, Doctor of Technical Sciences, and N. A. Kheyfets, Doctor of Technical Sciences; Ed. of Publishing House: N. A. Gortsuyeva; Tech. Ed.: V. P. Rozhin; Managing Ed.: S. D. Krasil'nikov, Engineer.

PURPOSE: This textbook is intended for students in higher engineering institutes. It may also be used by technical and engineering personnel working in the field of pilotless aircraft.

COVERAGE: The book describes fundamentals in the theory of the aerodynamics and dynamics of pilotless aircraft operating in the Earth's atmosphere. Equations for the motion of aircraft, approximate

Card 1/42

Flight Dynamics (Cont.)

SOV/6287

methods of determining aerodynamic characteristics for aircraft having various aerodynamic design features and for a wide range of Mach numbers, and the dynamic characteristics of aircraft are investigated. References are listed after each chapter.

TABLE OF CONTENTS [Abridged]:

Foreword	3
Basic Symbols	5
Introduction	11
Ch. I. Equations of Motion for Jet Aircraft	26
Ch. II. Methods of Investigating Equations of Motion	72
Ch. III. Lift	103

Card 2/42

CHERNOBROVKIN, L.S.

Determining the fuel mass ratio and thrust-weight ratio of an aircraft at a given law of its motion. Izv.vys. ucheb.zav.; av. tekhn. 7 no. 1:37-46 '64. (MIRA 17:5)

FEZRUCHKO, V.S., inzh.; GOROZA, Z.I., inzh.; CHERNOBROVKIN, N.A.,
inzh.; SHARBATOV, I.T., inzh., retsenzent; ZHEREBIN,
M.I., inzh., retsenzent [deceased]; POTOTSKIY, G.I.,
inzh., red.; USENKO, L.A., tekhn. red.

[Handbook for the track supervisor] Spravochnik dorozhnogo
mastera. Moskva, Transzheldorizdat, 1963. 477 p.
(MIRA 16:7)

(Railroads--Track)

CHERNOBROVKIN, V. P.

Mnogoriadnye vagranki. Moskva, Mashgiz, 1949. 45 p. diagrs.

Multiserial cupola furnaces.

DLC: TS231.045

SO:: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953.

BALENSKIY, V.A., and: SERENSHOUKIN, V.P., Sektor tekhn.nauk

Dependence of the shrinkage and structure of iron castings on the
temperatures and time of pouring. Izv. profiz. no. 7328-29 31 195.
(MIRA 18:3)

ANAN' IN, AnatoliyAndreyevich; ~~CHERNOBROV~~CHERNOBROVSKIN, Viktor Petrovich; GORSHKOV, A.A., redaktor; VOLPYANSKIY, L.M., redaktor; BORITSKIY, A.A., retsen- zent; DUGINA, N.A., tekhnicheskoy redaktor

[Smelting iron in cupola-furnaces] Plavka chuguna v vagranke. Mo- skva, Gos. nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1955. 66 p.
(MIRA 9:3)

(Cast iron) (Cupola furnaces)

~~CHERNORROV~~ CHERNORROV IN Viktor Petrovich; SHABALIN, L.A., inzhener, retsenzent;
DUGINA, N.A., tekhnicheskikh redaktor

[New method of controlling the quality of iron while smelting
and pouring] Novyi metod kontrolya svoistv chuguna po khodu plavki
i zalivki. Moskva, Gos. nauchno-tekhn. izd-vo mashinostroit. lit-ry,
1956. 36 p. (MLRA 10:6)
(Iron--Metallurgy)

Chernobrovkin, V. P.

AUTHORS: Khrapov, A. Ya, and Chernobrovkin, V. P. 126-2-29/30

TITLE: Measurement of the limit wetting angles of iron on a graphite base. (Izmereniye krayevykh uglov smachivaniya chuguna na grafitovoy podkladke).

PERIODICAL: "Fizika Metallov i Metallovedeniye" (Physics of Metals and Metallurgy), Vol. IV, No. 2, 1957, pp. 381-383 (USSR).

ABSTRACT: Due to imperfect experimental techniques it is at present impossible to determine directly the specific free surface energy of a solid body at its surface of contact with a liquid, σ_{sl} . Therefore, various authors investigating the shape and dimensions of crystals as a function of the influence of surface-active admixtures, base their investigations on the surface tension relative to gas, σ_{sg} , assuming that there is an analogy between σ_{sg} and σ_{sl} . To verify the character of the changes of σ_{sl} and σ_{sg} for iron the authors measured experimentally σ_{sg} and the boundary wetting angles of iron on a graphite base. They assumed that the limit wetting angle of a melt drop on a solid base in the atmosphere of an inert gas can serve as a criterion of the interphase tension σ_{sl} . In fact, the smaller the limit wetting angle, the smaller will be the surface tension and the better the melt will wet the surface of the base and vice versa. The limit wetting

Card 1/2

Measurement of the limit wetting angles of iron on a graphite base. (Cont.)

126-2-29/30

angles were measured according to a method described by Levin, A.M. (6), the essence of which is to determine the contour of the metal drop on the screen, by means of a system of lenses from the light emission of the metal at elevated temperatures. The results are summarised in a table, p.383. With increasing sulphur contents the limit wetting angles decrease from 115° for 0.1% S to 90° for 0.5% S. Comparison of the measured limit angles with the earlier measured surface tension permits the conclusion that for iron a general qualitative relation exists between changes in σ_{sg} and the limit wetting angle and thus also between σ_{sg} and σ_{sl} . It is mentioned that the here described measurement of the limit wetting angle of iron on a graphite base can be applied very extensively in works laboratories. There are 1 sketch, 1 table, 6 Slavic refs.

Card 2/2

SUBMITTED: May 14, 1956.

ASSOCIATION: Institute of Metallurgy, Ural Branch, Ac.Sc. USSR.
(Institut Metallurgii, Ural'skogo Filiala AN SSSR.)

AVAILABLE:

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1986, 1987
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CHERNOBROVSKIN, V. P.

AUTHOR: /Chernobrovkin, V. P. //

126-3-33/34

TITLE: Change of the electric resistance of cast iron as a result of graphite formation in it. (Izmeneniye elektrosoprotivleniya chuguna v svyazi s obrazovaniyem v nem grafita).

PERIODICAL: "Fizika Metallov i Metallovedeniye" (Physics of Metals and Metallurgy), 1957, Vol.4, No.3, pp. 564-566 (U.S.S.R.)

ABSTRACT: The electric resistance of graphite is considerably higher than that of ferrite, pearlite and cementite and, therefore, it can be assumed that at the instant of formation of the graphite the electric resistance of the iron will increase. Consequently, if the changes in temperature and in the electric resistance are studied as a function of time it is possible to determine the temperature range of graphite formation which in turn permits accurate determination of the instant when graphite is formed both during and after solidification of the iron. Furthermore, it would be possible to establish the relation between the increase in electrical resistance and the dimensions of the forming graphite inclusions and this would permit elaboration of a technological method of monitoring the shape of graphite formation in iron. The electric resistance of the iron was

Card 1/2

126-3-33/34

Change of the electric resistance of cast iron as a result of graphite formation in it. (Cont.)

determined in a sand mould by a voltmeter-ammeter circuit, as shown in Fig.1, p.465. The results obtained for white and grey iron in over 100 experiments are summarised in Tables 1-3, p.565. It is concluded that in ordinary grey iron graphite forms during the process of solidification and that the change in the electric resistance during solidification depends on the shape and the quantity of forming graphite. By determining the electric resistance of the iron it is possible to elaborate a technological method of checking the shape and quantity of graphite inclusions which form during the process of solidification of the iron in the mould.

Card 2/2

There are 3 tables, 1 figure and 4 Slavic references.

SUBMITTED: December 13, 1956.

ASSOCIATION: Institute of Metallurgy Ural Branch of the Ac.Sc.
U.S.S.R. (Institut Metallurgii Ural'skogo Filiala AN SSSR).

AVAILABLE: Library of Congress

CHERNOBROVKIN, V.P., inzhener.

~~Over-all method of metal investigation.~~ Lit. proizv. no. 5:22-25 My '57.
(Metal--Testing) (MIRA 10:6)

CHERNOBROVKIN, V.P., kand.tekhn.nauk; BARANOV, I.A., red.; FREGER, D.P.,
tekhn.red.

[Instrument for determining shrinkage of metals] Pribor dlia
opredeleniia lineinoi usadki metallov. Leningrad, 1955. 9 p.
(Leningradskii dom nauchno-tekhnicheskoi propagandy. Informatsionno-
tekhnicheskii listok, no.58(746)) (MIRA 10:12)
(Metals)

Chernobrovkin, Viktor Petrovich

ANAN'IN, Anatoliy Andreyevich; BRILAKH, Mikhail Mikhaylovich; CHERNOBROVKIN, Viktor Petrovich; FILIPPOV, A.S., kand.tekhn.nauk, retsenzent; MAKURIN, P.I., kand.tekhn.nauk, retsenzent; ZIMIN, V.M., inzh., retsenzent; SARAFANNIKOVA, G.A., tekhn.red.

[Cupola furnace operator] Vagranshchik. Moskva, Gos.nauchno-tekhn. izd-vo mashinostroit.lit-ry, 1957. 151 p. (MIRA 11:2)
(Cupola furnaces) .

*C*HERNOBROVKIN, V.P.
USSR/Atomic and Molecular Physics - Liquids

D-8

Abs Jour : Ref Zhur - Fizika, No 1, 1958, 832

Author : Krapov, A.Ya., Chernobrovkin, V.P.

Inst : -

Title : Measurement of the Edge Wetting Angles of Cast Iron on a Graphite Base.

Orig Pub : Fiz. metallov k metallovedeniye, 1957, 4, No 2, 381-383

Abstract : No abstract.

Card 1/1

On the other hand, electrical resistance is decreased 4, 50% when the temperature is raised to 200°C. It is assumed that the decrease is due to the breaking of the hydrogen bonds between the polymer chains. The decrease in resistance is not due to the decrease in the thickness of the polymer film, as it is not observed when the film is heated in a vacuum oven.

AUTHOR: Chernobrovkin, V. P.

126-5-3-29/31

TITLE: On the Nature of Preshrinkage Expansion of Iron Castings.
(K voprosu o prirode predusadochnogo rasshireniya
chugunnykh otlivok)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol 5, Nr 3,
pp 563-564 (USSR)

ABSTRACT: If liquid metal is poured into a mould, the external dimensions of the casting increase at first and then, after a certain time, start decreasing. This fact can be best observed by pouring the metal into a horizontal mould; the initial increase in the length of the casting is referred to as preshrinkage expansion. By means of earlier described special investigations (Ref.3), the author determined that there are three causes of this preshrinkage expansion. The first is associated with an increase in the volume of the cast iron due to the formation in it of an austenite-graphite eutectic. The second cause is associated with thermal expansion of the external shell of the casting during the period when the
Card 1/2 mould draws off the over-heating heat and the crystallisation heat of the metal. The third cause is associated with

On the Nature of Preshrinkage Expansion of Iron Castings^{126-5-3-29/31}

the growth of graphite inclusions in the external shell of the casting during solidification of the liquid metal of the shell. The effect of one or the other of these factors on the preshrinkage expansion of the iron poured into the mould will differ. A few examples are considered and explained. It is concluded that the preshrinkage expansion is associated not only with the properties of the metal but also with the pouring; it depends on the character of the solidification of the alloy, the conditions of pouring, the state of the mould, the temperature of the metal, the dimensions and configurations of the mould, etc. In the case of cast iron it also depends on the graphite which forms in the external shell of the casting.

Card 2/2

There are 4 references, all of which are Soviet.

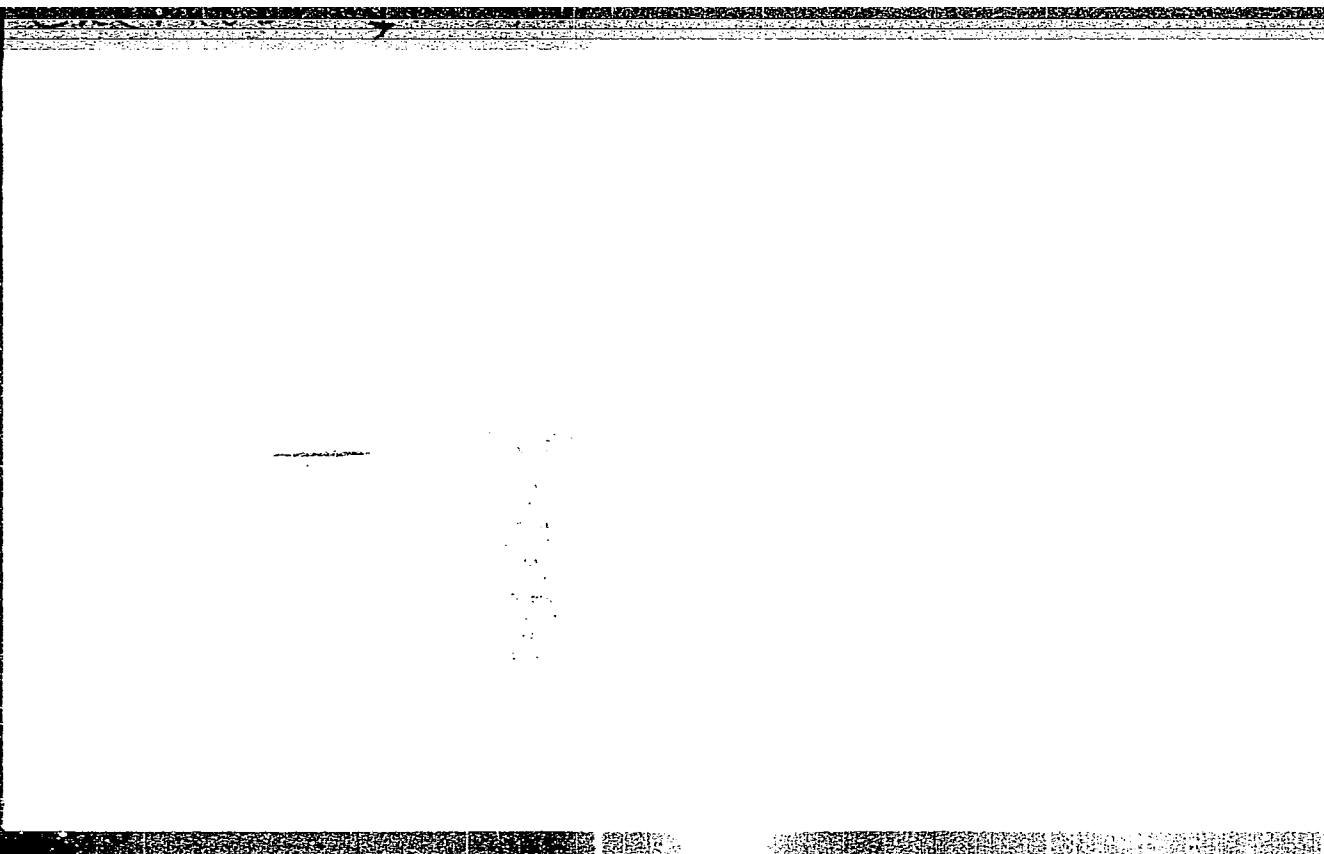
ASSOCIATION: Institut metallurgii Ural'skogo filiala AN SSSR
(Institute of Metallurgy, Ural Branch of the Ac.Sc., USSR)

SUBMITTED: April 15, 1957

1. Iron--Casting
2. Liquid metals--Physical properties
3. Metallurgy

"APPROVED FOR RELEASE: 06/12/2000

CIA-RDP86-00513R000308520010-2



APPROVED FOR RELEASE: 06/12/2000

CIA-RDP86-00513R000308520010-2"

CHERNOBROUKIN, V.P.

Shashina and 1988. Dual-city filed. Institut metallurgii	
Shaf, V.P. 6 (Connections of the Institute of Metallurgy, Ural Branch, Academy of Sciences, USSR, No. 6) Sverdlovsk, 1978. 157 p. Kirens	
ally inserted. 1,000 copies printed.	
Mikhailovskiy, M.A. Vvedeniye (Intro. Ed.), Candidate of Technical Sciences; A.A. Mikhailovskiy, Professor, Doctor; V.Ye. Miller, Professor; P.A. Pashkov, Candidate of Technical Sciences; and G.S. Lisovsky, Candidate of Technical Sciences; M.L. M.L. Kuznetsov.	
FOREWORD: This book is intended for ferrous and nonferrous metallurgists.	
CONTENTS: The book presents results of investigations of theoretical problems in metallurgy and chemistry and their application on the efficient use of materials in ferrous and nonferrous metallurgy and on the development of new production processes in the metallurgical and chemical industries. The articles were written by junior members and experienced specialists of the scientific staff of the Institutes of Metallurgy, Chemistry, and Electrochemistry, Ural Branch, Academy of Sciences, USSR.	19
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SOV/137-59-2-3709

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 2, p 203 (USSR)

AUTHOR: Chernobrovkin, V. P.

TITLE: A Comprehensive Investigation of the Properties of Cast Irons
(Kompleksnoye issledovaniye svoystv chugunov)

PERIODICAL: Tr. In-ta metallurgii. Ural'skiy fil. AN SSSR, 1958, Nr 2, pp 81-93

ABSTRACT: A new method for comprehensive investigation of the properties of the metal [gray and white cast irons (CI)] was developed. The method is based on the employment of a special device which automatically records the transient curves of the processes of cooling and contraction and registers the electrical resistivity, thus providing data characterizing the properties of metal cast in a mold and its behavior during cooling. The following factors were determined in the process: The duration of six separate cooling periods, temperatures of phase transformations, eight types of linear dimensional changes, and nine types of variations in electrical resistivity. A 10-kg HF induction furnace with an acid lining was employed for the experimental smelting of metal. The following was established: 1) The relationship

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A Comprehensive Investigation of the Properties of Cast Irons

observed between the rate of cooling, the linear variations, and the variations in electrical resistivity of a CI reflects the structural and phase transformations occurring in the CI during cooling; 2) the rate of cooling, the structure, and the susceptibility of the CI to graphitization, as well as the magnitude of various forms of contraction may be determined from the linear-contraction curves; 3) the pre-contraction expansion of CI cast in a green-sand mold is primarily a function of the behavior of the outer shell rather than that of the central zone; 4) the pre-contraction expansion of white CI is 5 times less than that of gray CI, whereas complete pre-pearlite shrinkage is almost 4 times as great; 5) owing to the considerable difference in the contraction properties of white and gray CI's, the properties of the latter may be determined from the appearance of the contraction curves; 6) the electrical resistivity of liquid CI's, white as well as gray, falls within the range of 144-149 microhms·cm. A 20-30% increase in the electrical resistivity observed in gray CI during its solidification is attributable to the segregation of lamellar graphite; it follows, therefore, that graphite is segregated during solidification of the CI rather than after the completion of this process.

S. Sh.

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SOV/137-58-11-23439

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 228 (USSR)

AUTHORS: Khrapov, A. Ya., Chernobrovkin, V. P.

TITLE: The Effect of Inoculants on the Surface Tension of Cast Iron (Vliyaniye modifikatorov na poverkhnostnoye natyazheniye chuguna)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chernaya metallurgiya, 1958, Nr 3, pp 42-51

ABSTRACT: The authors studied the effects of the addition of Fe-Si, Al, and Si-Ca on the surface-tension characteristics of cast iron (CI). CI containing 3.5% C, 1.14% Si, 0.57% Mn, 0.05% S, and 0.07% P served as the initial material. The summation of Ca and Si contents amounted to 4.64%. Fe-Si and Si-Ca were introduced into the CI in the form of small particles 2-3 mm in diameter. Al was introduced in the form of an Al wire on an Fe core. All inoculants were introduced into the CI at temperatures ranging from 1340 to 1370°C. The surface tension (ST) of the CI was measured by the method of maximum bubble pressure. It became evident that the addition of Fe-Si, Al, and Si-Ca alters the ST of the CI to a considerable degree. This indicates that Si, Al, and Ca are surface-active elements. The

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SOV/137-58-11-23439

The Effect of Inoculants on the Surface Tension of Cast Iron

addition of the Fe-Si to CI always results in a reduction of the ST, the latter being closely connected with processes of adsorption of Si in the surface layer. The action of both Al and Ca is more complex; an initial increase in ST of the CI is attributable to a chemical reaction of these elements with O₂ and S, substances characterized by their low ST. A subsequent decrease in the ST of CI is related to the adsorption of these substances in the surface layer. The cessation of the inoculation effect, which occurs as the temperature is increased in conjunction with protracted periods of soaking, is attributable to the deactivation of the inoculants. Bibliography: 18 references.

A. S.

Card 2/2

SOV/137-58-12-25194

Translation from. Referativnyy zhurnal. Metallurgiya, 1958, Nr 12, p 165 (USSR)

AUTHORS: Khrapov, A. Ya., Chernobrovkin, V. P.

TITLE: Effect of Addition of Metallic Calcium on the Surface Tension of Iron
(Vliyaniye prisadki metallichesкого kal'tsiya na poverkhnostnoye
natyazheniye chuguna)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Chern. metallurgiya, 1958, Nr 4,
pp 69-74

ABSTRACT: A study was made of the effect of the addition of metallic Ca on the surface tension of iron (I) and on the form of graphite with isothermal soaking and increase in temperature. I of the following composition (in %) was used: C 3.5, Si 2.1, Mn 1.0, S 0.05, and P 0.073. Metallic Ca in the form of shavings (0.2 - 1.0%) was introduced into the I heated to 1300 - 1400 C. The surface tension in the I was measured by the method of the maximum pressure in bubbles. It was found that addition of Ca produces at first a sharp increase and then a decrease in the surface tension of I. This phenomenon is caused 1) by the chemical reaction of Ca with the surface-active elements O₂ and S, and 2) by its partial dissolution in the I. The crystallization

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SOV/137-58-12-25194

Effect of Addition of Metallic Calcium on the Surface Tension of Iron

of I treated with Ca proceeds under qualitatively new physical conditions and, therefore, results not only in a finer I structure but also in the spheroidization of the graphite.

A. S.

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KAYBICHEV, A.V.; CHERNOBROVKIN, V.P.

Melting and overheating of cast iron in cupola furnaces.

Trudy Inst. met. UFAN SSSR no.4:101-106 '58.

(MIRA 12:10)

(Cupola furnaces) (Cast iron)

KAYBICHEV, A.V.; CHERNOBROVKIN, V.P.

Change in the chemical composition and heat capacity of cast
iron during its melting in cupolas. Trudy Inst. met. UFA
SSSR no.4:107-111 '58. (MIRA 12:10)
(Cupola furnaces) (Cast iron)

CHERNOBROVKIN, V.P.; DOBRYDEN', A.A.; HELYAYEV, V.S.

Phosphorus and titanium in gray foundry iron. Trudy Inst. met.
UFAN SSSR no.4:113-121 '58. (MIRA 12:10).
(Cast iron--Testing)

CHERNOBROVKIN, V.P.

Relation of volume changes in molten iron to its expansion before
shrinkage in the mold. Izv. Sib. otd. AN SSSR no.8:27-31 '58.
(MIRA 11:10)

1.Ural'skiy filial AN SSSR.
(Iron founding)

CHERNOBROV KIN, V. P.

18(5) PHASE I BOOK EXPLOITATION NOV/2048

Sverdlovsk. Ural'skiy politkhnicheskii institut imeni S.M. Kirova
Teoriya i praktika litynogo proizvodstva (Theory and Practice in the
Foundry Industry) Moscow, Mashgiz, 1959. 231 p. and 32 p.
(Series: Its: [Sbornik] vyp. 65) Errata slip inserted. 5,000
copies printed.

Ed. I. A.A. Gerasimov, Corresponding Member, USSR Academy of Sciences,
Doctor of Technical Sciences, Professor, Tech. Ed. M. A. Dugin,
Zase. Ed. (Ural-Siberian Division, Mashgiz); A.V. Isajeva,
Engineer.

PURPOSE: This book is intended for engineering and scientific workers
of institutes and machine-building plants, as well as for students
of advanced courses at vuses.

COVERAGE: This collection consists of articles dealing with practical
problems in foundry processes. The articles review the achieve-
ments of Ural foundry workers in the past 40 years and present
aspects of a current study on the casting of nodular cast iron,
aluminum and casting methods. A description is given of
articles and scientific casting. Consideration is given to the
problems of combining steel and aluminum. The structure
of cast steel is discussed. A section devoted to the investigation of vacuum
casting including its characteristic properties and applications
is also presented. There are 32 pages of photographs and illustrations
at the end of the book. No personalities are mentioned. References
follow each article.

TABLE OF CONTENTS:

Rukhadin, D.Ye. [Engineer]. Manufacture of Metal Rolls With an
Intermediate Zone 95

The author describes a method of introducing ferroilicon during
the casting of rolls. Its advantages compared to the usual me-
thod are given in respect to sealing off of the roll's upper
layer.

Chernobrovkin, V.P. [Candidate of Technical Sciences]. On Graphite
Inclusions in Cast Iron. 99
The author describes a method of introducing ferroilicon during
the casting of rolls. Its advantages compared to the usual me-
thod are given in respect to sealing off of the roll's upper
layer. The processes of crystallization of graphite in cast iron
castings were investigated. It was concluded that the growth of
graphite is more favorable when magnesium is introduced at
a low temperature. It was further concluded that during crys-
tallization of mottled magnesium cast iron the graphite nuclei
form in the liquid phase but their growth in outer layers of the
casting continues to a considerable degree in the solid phase,
where as in the central zone of the casting the formation of
nuclei and the growth of graphite inclusions take place in the
liquid phase during solidification.

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Chernobrovkin, V.P. [Candidate of Mechanical Sciences]. Radial
Shrinkage of Cast Iron Rolls 117
The author presents a method for investigating radial shrinkage
of cast iron rolls and gives the results obtained.

ANAN'IN, A.A., inzh.; CHERNOBROVKIN, V.P., kand.tekhn.nauk

Investigating the combustion zone in cupolas with one-layer
box-like and slit tuyeres. Izv.vys.ucheb.zav.; chern.
met. 2 no.10:139-145 0 '59. (MIRA 13:3)

1. Ural'skiy filial AN SSSR. Rekomendovano kafedroy litsynogo
proizvodstva Ural'skogo politekhnicheskogo instituta.
(Cupola furnaces)

CHERNOBROVKIN, V.

Complex study of the properties of cast iron. p. 7.

STUDII SI CERCETARI DE METALURGIE. Bucuresti, Rumania. Vol. 4, no. 1, 1959.

Monthly List of East European Accessions. (EEAI), LC. Vol. 8, no. 9, ^{Sept.} 1959.
Uncl.

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SOV/1 26-8-5-18/29

AUTHORS: Chernobrovkin, V.P., Belyayev, V.S., and Dobryden', A.A.

TITLE: Influence of Vacuum on the Changes in Critical Temperatures, Structure and Chemical Composition of Cast Iron²¹

PERIODICAL: Fizika metallov i metallovedeniye, Vol 8, 1959, Nr 5, pp 747-751 (USSR)

ABSTRACT: The authors give a brief account of the small amount of work (Refs 6, 7, 8) on the vacuum treatment of cast iron and go on to describe their own experiments. These were carried out in a type TGV-1 vacuum furnace with molybdenum elements (Fig 1), in which a residual pressure of 10^{-4} mm Hg could be produced. Iron was cast into special sand moulds (Ref 10), the critical temperatures being determined during the cooling. A 35-36 mm long section was cut from the ingots and machined into a crucible-shaped piece with an axial thermocouple hole 3.5-4 mm in diameter. The piece in its crucible was placed in a larger crucible on a refractory support in the furnace, the whole being covered with a bell-jar connected to the pumping system. After slow melting and holding for 30 minutes at about 1250 °C the iron was

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Influence of Vacuum on the Changes in Critical Temperatures,
Structure and Chemical Composition of Cast Iron

cooled, the critical points being determined. Below the eutectic-transformation temperature the specimen was held for 20 minutes and then finally cooled. The type of fracture was determined, polished sections were prepared and chemical analysis carried out. It was found (table) that the manganese content of the vacuum treated iron was 0.04-0.14% compared with 0.54-0.64 in the starting material, the corresponding figures for sulphur content being 0.007-0.008 and 0.042-0.069%, and for graphite 3.50-3.67 and 2.73-3.04. Silicon and phosphorus were unchanged at 1.7 and 0.14%, respectively. The vacuum treatment gave a reduction in the eutectic and an increase in the eutectoid transformation temperatures. The vacuum treatment did not affect the lamellar form of the graphite (Figs 2, 3) but the background changed from pearlitic to ferritic. A white iron (4.1% C, 0.18% Si, 0.2% Mn, 0.3% P) was also vacuum treated, after which it gave a grey fracture (Fig 4).

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Influence of Vacuum on the Changes in Critical Temperature,
Structure and Chemical Composition of Cast Iron

There are 4 figures, 1 table and 10 references, of
which 9 are Soviet and 1 is German.

ASSOCIATION: Institut metallurgii UFAN SSSR
(Institute of Metallurgy, Ural Branch of Acad.Sci.
USSR)

SUBMITTED: November 21, 1958

Card 3/3

CHERNOBROVKIN, V.P., kand.tekhn.nauk

Shrinkage in diameter of cast iron roll barrels. Trudy Ural.
politekh.inst. no.89:117-120 '59. (MIRA 12:8)
(Iron founding) (Rolls (Iron mills))

ANAN'IN, Anatoliy Andreyevich; KUZNETSOV, Stepan Petrovich; ~~CHE~~CHERNOBROVKIN, Viktor Petrovich; ZIMIN, V.P., inzh., retsenzent; FILIPPOV, A.S., kand.tekhn.nauk, red.; MARCHENKOV, I.A., tekhn.red.

[Progressive methods of operating cupola furnaces] Peredovye metody obsluzhivaniia vagranok. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry, 1960. 98 p. (MIRA 13:6)
(Cupola furnaces)

CHERNOBROVKIN, V. P.

PHASE I BOOK EXPLOITATION

SOV/4613

Akademiya nauk SSSR. Ural'skiy filial. Institut metallurgii

Voprosy kontrolya i kompleksnogo ispol'zovaniya syr'ya v metallurgii
(Problems of Control and Complete Utilization of Raw Materials in Metallurgy) Sverdlovsk, 1960. 194 p. (Series: Its: Trudy, vyp. 5) Errata slip inserted. 1,000 copies printed.

Resp. Eds.: M. I. Kochnev, and V. P. Chernobrovkin, Candidates of Technical Sciences. Ed. of Publishing House: I. M. Demin; Tech. Eds.: L. A. Izmodenova, and N. F. Seredkina.

PURPOSE: This collection of articles is intended for technical personnel of metallurgical plants and for members of scientific research institutes.

COVERAGE: The collection contains articles discussing a variety of problems pertaining to ferrous and nonferrous metallurgy. A number of articles describe new methods for investigating the properties of alloys and oxides and review changes which these properties undergo as a result of the effect of temperature and other factors. Findings of studies are summarized

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Problems of Control and Complete (Cont.)

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in numerous articles and processes to be used for manufacturing ferroalloys and naturally-alloyed steels are suggested. Characteristics of various metal compounds are given and measures for the most efficient utilization of ores are indicated. Some of the articles are devoted to the study of problems of manufacturing ferrous, nonferrous, and rare metals. The selection of topics was made on the basis of the need for material relating to the improvement of the quality control of alloys and the manufacturing processes employed to produce them. No personalities are mentioned. Each article is accompanied by references, most of which are Soviet.

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Sorokin, P.Ya. Producing Low-Carbon Ferrochromium by Blowing Under Reduced Pressure	11
Mikhaylikov, S.V., and V. V. Mikhaylov. Investigation of Possibilities of Preserving Chromium in Steel in Blowing Naturally-Alloyed Chromium Pig Irons	21

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CHERNOBROVKIN, V.P.

Electric resistivity of cast iron in the process of cooling
from the molten state to room temperature. Trudy Inst.met.
UFAN SSSR no.5:3-9 '60. (MIRA 13:8)
(Cast iron--Electric properties)

S/128/60/000/010/006/016/XX
A033/A133

AUTHORS: Chernobrovkin, V. P., and Anan'in, A. A.

TITLE: The burning zone in large cupolas

PERIODICAL: Liteynoye proizvodstvo, no. 10, 1960, 8 - 9

TEXT: The burning zone in cupolas is characterized by the chemical composition of the gas phase and by the temperature and area in which the burning process takes place. The main constituents of the gas phase are CO₂, CO, O₂, and N₂. The authors point out that although the burning zone of small extent [Ref. 1: Beldon "Stahl und Eisen", no. 9, 1914; Ref. 2: Dipschlage, E. "Giesserei", no. 1, 1928; Ref. 3: Sukharchuk, Yu. S. V. sb. "Sovremennyy vagranochnyy protsess", Mashgiz, 1952], the burning zone in large cupolas 1.5 m in diameter or more has not been investigated at all. P. G. Luzin [Ref. 4: V. sb. "Sovremennyy vagranochnyy protsess", Mashgiz, 1952] remarks in his work that in the central part of the bed charge of large cupolas in a radius of 400 - 600 mm the coke burns less intensive. The tuyere zone was investigated on cupolas of the Sinarskiy trubnyy zavod (Sinarsk Pipe Plant) having the following parameters: inner diameter -

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A033/A133

The burning zone in large cupolas

1,600 mm; jacket - 2,580 mm; useful height - 5,850 mm, height of hearth - 1,000 mm; three rows of eight tuyeres each at a distance of 300 mm; tuyere area of the lower row - 0.400, of the other rows 0.150 m² each. The cupola has an output of 25 tons/hour, coke consumption is 7.5 - 8.0%. Kemerovo coke of 50 - 60 mm lump size is used. The tapping temperature of the pig iron is 1,295 - 1,300°C on the average. The air consumption is 80 m³/m²/hour, the blast pressure 950 - 1,000 mm water column. To determine the composition and temperature of the gas in different points of the burning zone over the height and cross section of the cupola, a special water-cooled gas-collecting pipe of 26 mm outer diameter was used. A short description of the pipe is given and the authors enumerate the technical difficulties of obtaining the appropriate gas samples. The gas-collecting pipe was put in through the tuyere up to the cupola axis, while the gas was sampled and the temperature measured - with the aid of a thermocouple placed in the pipe - through every 100 mm. Over the height of the bed charge the burning zone was investigated at the level of the first and the third tuyere row. Fig. 3 shows the change in the composition and temperature of the gas on the level of the first tuyere row, Fig. 4 the identical results of the third row. In the latter case the oxygen content in the gas becomes

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The burning zone in large cupolas

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already insignificant at a distance of 200 mm from the tuyere, which can be explained by the small extent of the cooling zone, since the tuyeres are reached by the incandescent gases from the lower tuyere rows and the oxygen reacts immediately on leaving the tuyere. Compared to the first tuyere row the maximum CO₂ content in the gas is much higher on the level of the third row and attains 17%. There are 4 figures and 4 references: 2 Soviet-bloc and 2 non-Soviet-bloc.

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